

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A stent delivery system comprising:
 - an inner tube comprising a proximal end and a distal end, the inner tube being disposed within an outer tube with an annular space disposed therebetween, the distal end of the inner tube further comprising a distal tip having a proximal edge defining an edge diameter,
 - a heating element positioned around the inner tube proximal to the distal tip,
 - the outer tube comprising a proximal end and a distal end, the distal end of the outer tube being disposed proximally to the distal tip of the inner tube and defining a distal end diameter,
 - the distal end of the outer tube being connected to a balloon which extends between the distal end of the outer tube and the distal tip of the inner tube, the balloon overlying the heating element, and
 - an expandable stent positioned around the balloon and disposed between the distal end of the outer tube and the proximal edge of the distal tip,
 - ~~a heating element positioned around the inner tube proximal to the distal tip thereof for heating the stent to an elevated temperature,~~
 - wherein the stent is formed of a stent material having a shape memory transition temperature lower than ~~the~~ an elevated temperature produced by the heating element so that the stent expands in response to the heating provided by the heating element, and

wherein the edge diameter and distal end diameter are equal to or greater than a maximum outer diameter of the stent in an unexpanded form.

2. (Canceled)
3. (Original) The stent delivery system of claim 1 wherein the heating element comprises a coil.
4. (Original) The stent delivery system of claim 1 wherein the balloon is also connected to the distal tip of the inner tube.
5. (Original) The stent delivery system of claim 1 wherein the stent is crimped onto the balloon.
6. (Original) The stent delivery system of claim 1 wherein the stent comprises nitinol.
7. (Original) The stent delivery system of claim 1 wherein the stent is a self-expanding stent.
8. (Original) The stent delivery system of claim 1 wherein the balloon comprises an elastomeric material.

9. (Original) The stent delivery system of claim 1 wherein the distal tip of the inner tube is tapered.
10. (Original) The stent delivery system of claim 1 wherein the inner tube comprises a distal radiopaque marker disposed immediately proximal to the distal tip and a proximal radiopaque marker disposed immediately distal to the distal end of the outer tube.
11. (Canceled)
12. (Original) The stent delivery system of claim 1 wherein the heating element is connected to a power line and a return line that extends along the inner tube to the proximal end thereof.
13. (Original) The stent delivery system of claim 12 wherein the heating element, power line and return line are encased in a layer of insulating material.
14. (Previously Presented) A method of deploying an expandable stent in a vasculature system comprising:
- providing a stent delivery system comprising
 - an inner tube comprising a proximal end and a distal end, the inner tube being disposed within an outer tube with an annular space disposed therebetween, the distal end of the inner tube further comprising a distal tip having a proximal edge defining an edge diameter,

the outer tube comprising a proximal end and a distal end, the distal end of the outer tube being disposed proximally to the distal tip of the inner tube, the distal end of the outer tube being connected to a balloon which extends between the distal end of the outer tube and the distal tip of the inner tube,

a cylindrical expandable stent disposed around the balloon and disposed between the distal end of the outer tube and the proximal edge of the distal tip,

wherein the edge diameter and distal end diameter are equal to or greater than a maximum outer diameter of the stent in an unexpanded form,

inserting the stent delivery system, with the stent in the unexpanded form, into the vasculature system and to a desired position;

heating the stent to expand the stent and causing it to adhere to the vasculature system at the desired position;

deflating the balloon; and

withdrawing the inner and outer tubes and balloon from the vasculature system.

15. (Original) The method of claim 14 wherein during the heating of the stent the balloon is heated and partially inflated.

16. (Original) The method of claim 14 wherein the stent is a self-expanding stent and during the inserting step, the balloon and stent are cooled.

17. (Original) The method of claim 14 wherein the cooling is performed using cool saline solution delivered through the annular space and into the balloon.

18. (Original) The method of claim 14 wherein the heating is performed using warm saline solution delivered through the annular space and into the balloon.
19. (Original) The method of claim 14 wherein the heating is performed using a heating element.
20. (Original) The method of claim 19 wherein the heating element comprises a coil connected to a power line that extends along the inner tube to the proximal end thereof and the current is supplied to the heating element through the power line.
21. (Original) The method of claim 19 wherein a thermocouple is disposed on the distal end of the inner tube and the method further comprises monitoring temperature during the heating step.
22. (Original) The method of claim 14 wherein the stent delivery system further comprises a protective sheath disposed over the stent and the method further comprises removing the protective sheath prior to the inserting step.
23. (Currently Amended) A stent delivery system comprising:
an inner tube comprising a proximal end and a distal end, the inner tube being disposed within an outer tube with an annular space disposed therebetween, the distal end of the inner tube further comprising a tapered distal tip having a proximal edge defining an edge diameter,

the outer tube comprising a proximal end and a distal end, the distal end of the outer tube being disposed proximally to the distal tip of the inner tube and defining a distal end diameter, the distal end of the outer tube being connected to a balloon which extends between the distal end of the outer tube and the distal tip of the inner tube, the balloon at least partially overlying ~~the~~ a heating element positioned around the inner tube proximal to the distal tip thereof,

the balloon also being connected to the distal tip of the inner tube, the balloon being disposed within and engaging a cylindrical expandable stent which overlies the balloon and is disposed between the distal end of the outer tube and the proximal edge of the distal tip wherein the edge diameter and distal end diameter are equal to or greater than a maximum outer diameter of the stent in an unexpanded form, and

~~a heating element positioned around the inner tube proximal to the distal tip thereof for heating the stent to an elevated temperature,~~

wherein the stent is formed of a material having a shape memory transition temperature lower than ~~the~~ an elevated temperature to which the heating element heats the stent so that the stent expands in response to the heating provided by the heating element.

24. (Original) The stent delivery system of claim 23 wherein the stent is crimped onto the balloon.

25. (Original) The stent delivery system of claim 23 wherein the stent comprises nitinol.

26. (Original) The stent delivery system of claim 23 wherein the stent is a self-expanding stent.
27. (Previously Presented) A method of deploying an expandable stent in a vasculature system comprising:
- providing a stent delivery system comprising
 - an inner tube comprising a proximal end and a distal end, the inner tube being disposed within an outer tube with an annular space disposed therebetween, the distal end of the inner tube further comprising a tapered distal tip having a proximal edge defining an edge diameter,
 - a heating element being positioned on the distal end of the inner tube and proximal to the distal tip,
 - the outer tube comprising a proximal end and a distal end, the distal end of the outer tube being disposed proximally to the distal tip of the inner tube and defining a distal end diameter, the distal end of the outer tube being connected to a balloon which extends between the distal end of the outer tube and the distal tip of the inner tube, the balloon at least partially overlying the heating element, the balloon also being connected to the distal tip of the inner tube,
 - the balloon being disposed within and engaging a cylindrical expandable stent which overlies the balloon and is disposed between the distal end of the outer tube and the proximal edge of the distal tip wherein the edge diameter and distal end diameter are equal to or greater than a maximum outer diameter of the stent in an unexpanded form,

inserting the stent delivery system, with the stent in the unexpanded form, into the vasculature system and to a desired position; and

heating the stent by supplying current to the heating element to expand the stent and causing it to adhere to the vasculature system at the desired position.

28. (Original) The method of claim 27 further comprising:
deflating the balloon; and
withdrawing the inner and outer tubes and balloon from the vasculature system.
29. (Original) The method of claim 27 wherein the stent is a self-expanding stent and during the inserting step, the balloon and stent are cooled.
30. (Previously Presented) The method of claim 27 wherein a cooling is performed using cool saline solution delivered through the annular space and into the balloon.
31. (Original) The method of claim 27 wherein a thermocouple is disposed on the distal end of the inner tube and the method further comprises monitoring temperature during the inserting and heating steps.
32. (Original) The method of claim 27 wherein the stent delivery system further comprises a protective sheath disposed over the stent and the method further comprises removing the protective sheath prior to the inserting step.